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1: J Bone Miner Res 2001 Apr;16(4):782-7 Related Articles, Books, LinkOut

Inhaled corticosteroids reduce bone mineral density in early postmenopausal but not premenopausal asthmatic women.

Fujita K, Kasayama S, Hashimoto J, Nagasaka Y, Nakano N, Morimoto Y, Barnes PJ, Miyatake A.

University of Shiga Prefecture, Hikone, Japan.

Inhaled corticosteroids are widely used in the treatment of bronchial asthma, but it is still uncertain whether long-term use of the inhaled corticosteroids affects bone metabolism in asthmatic patients. In this study, we examined the effect of inhaled beclomethasone dipropionate (BDP) on bone mineral density (BMD) and biochemical markers of bone metabolism in pre- and early postmenopausal asthmatic women. Thirty-six (17 premenopausal and 19 early postmenopausal) asthmatic women and 45 healthy control (24 premenopausal and 21 early postmenopausal) women were investigated. All the asthmatic patients were treated with BDP (542 +/- 298 microg/day; 100-1200 microg/day) without any systemic administration of corticosteroids for at least 1 year. In premenopausal women, BMD as well as the biochemical markers of bone metabolism did not differ between control subjects and BDP-treated asthmatic patients. By contrast, in early postmenopausal women, BMD was significantly lower in BDP-treated asthmatic patients than in control subjects. In these early postmenopausal women, serum intact osteocalcin concentration was lower in the BDP-treated asthmatic patients than in the control subjects whereas urinary free pyridinoline (F-PYD) and free deoxypyridinoline (F-DPD) concentrations did not differ between the groups. Thus, early postmenopausal, but not premenopausal, asthmatic patients who were treated with inhaled BDP had reduced BMD, which was associated with a decreased level of the bone formation marker. Ovarian hormones may be protective against the adverse effect of inhaled BDP on bone metabolism in the premenopausal patients.

PMID: 11316007 [PubMed - indexed for MEDLINE]

2: Respirology 1999 Mar;4(1):63-7 Related Articles, Books, LinkOut

Online

Effects of inhaled corticosteroid on bone turnover in children with bronchial asthma.

Chay OM, Goh A, Lim WH, Leong KH, Lou J.

Tan Tock Seng Hospital, Republic of Singapore.

Long-term usage of systemic steroids is associated with multiple side effects. One of the major morbidities is due to its effect on bone metabolism leading to bone loss and resulting in skeletal fractures. This study was conducted to determine the effects of inhaled steroids on bone mineral density (BMD) and biochemical bone markers.

Twenty-four children with frequent episodic or mild persistent asthma who satisfied the clinical criteria for starting on inhaled corticosteroids (ICS) were enrolled into the study. The BMD scan was done using dual energy X-ray absorptiometry, prior to starting ICS therapy and 6 months later. Biochemical markers of bone metabolism, (i) serum osteocalcin as a bone formation marker, and (ii) urinary deoxypyridinoline (Upd) as a bone resorption marker, were taken prior to ICS treatment and at 2 monthly intervals. The biochemical markers were all taken in the morning. Twenty-four, age- and sex-matched children with mild episodic asthma, not requiring ICS, were used as controls for the BMD measurements. The BMD scan was done upon enrollment into the study and 6 months later. Twenty-four children on ICS and 24 controls completed the study. The subjects were on a mean dose of beclomethasone dipropionate (BDP) 0.4 mg/day. One subject needed a short course of Prednisolone in the early treatment period. None of the controls needed oral steroid therapy. One child in the control group sustained a greenstick fracture after an accidental fall. The mean rate of change of BMD was 1.8% +/- 12.3 in the subjects on BDP. This was lower than the 6.1% +/- 10.6 among the control subjects. However, this difference did not reach statistical significance (P = 0.16). There was a significant increase in serum osteocalcin level after 6 months of BDP treatment from 66.83 +/- 22.71 ng/mL to 81.61 +/- 24.66 ng/mL (P < 0.005). There was a decline in Upd from 36.2 +/- 47.1 nmol/mmol creatinine to 21.4 +/- 6.92 nmol/mmol creatinine. However, this did not reach statistical significance. There was no difference in the statural gain between the subjects on ICS and their controls. This study showed that 6 months of ICS therapy (mean dose 0.4 mg/day) had no significant adverse effect on bone metabolism in asthmatic children.

Publication Types:
- Clinical trial
- Controlled clinical trial

PMID: 10339732 [PubMed - indexed for MEDLINE]

3: Ann Periodontol 1998 Jul;3(1):257-61 Related Articles, Books, LinkOut

The association between alveolar bone loss and pulmonary function: the VA Dental Longitudinal Study.

Hayes C, Sparrow D, Cohen M, Vokonas PS, Garcia RI.

VA Normative Aging Study, VA Outpatient Clinic, Boston, MA, USA.
chayes@infonet.tufts.edu

The effect of oral conditions on medical outcomes is not well understood. The purpose of this epidemiological investigation was to examine whether the risk for chronic obstructive pulmonary disease (COPD) is enhanced among individuals with a history of periodontal disease as assessed by radiographic alveolar bone loss (ABL). Subjects were selected from the VA Dental Longitudinal Study, a long-term study of aging and health in male veterans who were medically healthy at baseline. Subjects are not VA patients. Those subjects with a forced expiratory volume in 1 second (FEV1) less than 65% of predicted volume were categorized as having COPD. ABL was assessed by using full-mouth series periapical films measured by a Schei ruler. Bone loss at each interproximal site was measured in 20% increments, and the mean whole-mouth bone loss score was calculated. Logistic regression analysis was used to determine the independent contribution of bone loss measurement at baseline to the subsequent risk of developing COPD over a 25-year follow-up period. Covariates included measures of smoking, height, age, education, and alcohol consumption. Of the 1,118 medically healthy dentate men at baseline, 261 subsequently developed COPD. We found that ABL status at baseline was an independent risk factor for COPD, with subjects in the worst population quintile of bone loss (mean ABL > 20% per site) found to be at significantly higher risk (OR = 1.8; 95% CI = 1.3, 2.5). The results of this analysis indicate that increased ABL is associated with an increased risk for COPD

PMID: 9722709 [PubMed - indexed for MEDLINE]

4: Respir Med 1993 Feb;87 Suppl A:9-13; discussion 13-4 Related Articles, Books, LinkOut

Methods of measurement of bone turnover and clinical evaluation of osteoporosis: relevance to asthma and corticosteroid therapy.

Reid DM.

Rheumatology Department, City Hospital, Aberdeen, U.K.

Bone turnover can be assessed by measurements of biochemical markers. Serum alkaline phosphatase and osteocalcin can be used as indices of bone formation, and hydroxyproline and pyridinium crosslinks in urine can be used to assess bone resorption. These markers are able to detect changes induced by high-dose corticosteroid therapy given by the oral or inhaled route. However, a clinical diagnosis of osteoporosis requires, in addition, the presence of at least one relatively atraumatic fracture. Fracture risk may be assessed by in vivo measurement of bone density, for which a number of new techniques, including single-photon absorptiometry, dual-photon absorptiometry, dual-energy X-ray absorptiometry, and quantitative computed tomography, have been developed and are now in clinical use.

Publication Types:
- Review
- Review, tutorial

PMID: 8497715 [PubMed - indexed for MEDLINE]

5: N Engl J Med 1983 Aug 4;309(5):265-8 Related Articles, Books, LinkOut

Steroid-induced fractures and bone loss in patients with asthma.

Adinoff AD, Hollister JR.

To study the association between bone disease and long-term steroid administration in asthmatics, we reviewed the hospital records of 128 patients over 40 years of age who had taken daily or alternate-day adrenal corticosteroids for at least a year and compared them with the records of 54 other asthmatics of similar age who had not required long-term administration of steroids. We found evidence in the records of a total of 58 fractures of the ribs or vertebrae in 14 of the patients who had received long-term steroid treatment (11 per cent) and no evidence of fractures in the patients who had not received long-term treatment. We also prospectively studied 30 hospitalized asthmatic patients between 20 and 70 years of age who had been screened for medications (other than steroids) or complicating diseases known to affect bone mineralization. Eight of 19 asthmatic patients receiving long-term steroid therapy had rib or vertebral fractures, whereas none of 11 matched patients not receiving such therapy had fractures. Furthermore, bone-density measurements of the distal and proximal radius by photon absorptiometry revealed that the trabecular, but not the cortical, bone mass was below normal in the former group of patients but not in the latter. Within the long-term steroid group, there was no significant correlation between bone density and dose or duration of steroid treatment. We conclude that long-term steroid therapy in asthmatic patients is associated with decreased trabecular bone density and an increased prevalence of rib and vertebral fractures.

PMID: 6866051 [PubMed - indexed for MEDLINE]

6: Clin Allergy 1982 Jul;12(4):363-8 Related Articles, Books, LinkOut

Bone studies in patients on prolonged systemic corticosteroid therapy for asthma.

Greenberger PA, Hendrix RW, Patterson R, Chmiel JS.

Cortical thickness of the second metacarpal bone and lumbar spine fractures were determined radiographically in twenty-one caucasian corticosteroid-dependent asthmatics (mean age, 61.2 years; range 47-73 years). The mean number of prednisone years per patient of continuous corticosteroid treatment averages 9.7 (range 5.0-21.5 years), and the mean accumulated dose of prednisone was 46.7 g (range 10.7-160 g). Thirteen of twenty-one (61.9%) patients had cortical thickness between 1 and 2 standard deviations (s.d.) below the age- and sex-specific mean for normals, but only four (19%) patients fell below 2 s.d. Although the study indicated decreased cortical thickness in the prednisone-treated group, in only one (4.8%) patient were vertebral fractures present, an incidence not unexpected in this group. In serious chronic asthma, concern for bone structure should not prohibit the cautious use of appropriate corticosteroid regimens at the lowest possible maintenance dose.

PMID: 7116612 [PubMed - indexed for MEDLINE]